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MEMORANDUM

To: Bonnie Lavelle, Chris Weis

From: Mary Goldade, Bill Brattin

Date: November 4, 1999

RE: Vasquez Boulevard and I-70 Site
Proposed Sampling Design for Schools and Parks

cc: Project files

Introduction

This memorandum provides a proposed sampling design for schools and parks soils at the VBI70 site. If you agree with the general approach, we will prepare another memorandum that will serve as the complete Sampling and Analysis Plan for data collection at schools and parks. Please feel free to contact me at (303) 292-4142 if there are any issues or points that require additional discussion.

Summary of Proposed Plan

Thirty (30) grab samples will be collected at each school or park identified by EPA for Phase III sampling. A 2-inch diameter core sample will be collected at the soil surface (0-2 inch depth) at each grab sample location. Sample locations will be selected using a grid system that will ensure even spacing across the property. Samples will be prepared and analyzed in the same manner as residential yard soils collected during Phase III.

Rationale for Proposed Design

Several components were considered in development of a sampling design that will support the VBI70 human health risk assessment. We considered the following questions:

1. Should composite or grab samples be collected?
2. How many samples should be collected?
3. Should a biased or stratified-random sampling approach be employed?
4. How big should each sample be?
5. Should schools and parks that have been sampled as part of Phase I be resampled using the new approach?

A discussion and rationale for each decision is provided below.

1. Should composite or grab samples be collected?

ISSI considered several sampling schemes including a) overlapping multi-point composite samples (similar to Phase III residential soil sampling), b) multi-point composite samples from individual regions about the property, and c) individual grab samples. While collection of overlapping composites has the advantage of being consistent with Phase III, the main reason this approach was used for Phase III was to limit the number of samples because of the very large number of locations. We always new that this approach sacrificed information about spatial patterns within a property. Because the number of schools and parks is much smaller than the number of residences, we felt that we could now use an approach that would get us spatial information. Therefore, we focused on either non-overlapping composites or simply grabs. We concluded that, because of the attention focused on acute and sub-acute risks and the issues of hot spots, collection of composites would still generate debate and concern ("What if you have diluted out a hot spot ....."), and that it would simply be best to go straight to grab samples.

2. How many samples should be collected?

ISSI recommends that 30 grab samples be collected at each school or park. This number was chosen for several reasons. First, the number 30 is consistent with the number of grab sample locations at residential properties, and is consistent with the number of grabs that will be collected during the Phase III alleyway pilot study. Second, 30 samples will provide a good evaluation of spatial pattern within a property (this allows for hot spot identification), and is high enough that the 95% UCL is expected to be reasonably close to the sample mean, even if there is significant inter-sample variability (this is not expected).

3. Should a biased or stratified-random sampling approach be employed?

A stratified-random sampling approach is recommended to support the risk assessment. Sample locations will be assigned using a grid system that ensures even spatial representation across the property. The specific size of the grids (10' x 10' or 20' x 20', etc.) will be determined after the dimensions of the properties are known.

4. How big should each sample be?

ISSI recommends collecting the same 2-inch by 2-inch core that is currently used for Phase III. This will generate a grab sample of about 100 g. Of this, about 5-10 g is needed for analysis, leaving a reasonable archive for some types of additional testing (e.g., speciation, bulk vs fines, etc), if needed. In the event that all or part of a property has contaminant concentrations above the decision criteria and soil removal is required, larger samples of soil can be collected at a later time to help support source identification. Based on existing data, this is not expected.

5. Should schools and parks that have been sampled as part of Phase I be resampled using the new approach?

Several schools and all parks within the VBI70 study boundaries were sampled in the Spring 1998 (Phase I). A summary of the results is attached. Arsenic was below detection limits (about 44 ppm) in most samples (96 out of 101 = 95%), although one detect at 340 ppm did occur. Mean lead concentrations were all well below a screening level of 400 ppm in all samples, although one park reported a maximum of 420 ppm.

Several of the properties were relatively well sampled, with an N value of 12-26. However, the majority of the properties were sampled with only 3-8 samples. This raises a question as to whether or not any of these need to be resampled. ISSI recommends that these properties not be resampled at this time, since the current data do not indicate there is likely to be contamination in these parcels. An exception is St. Charles Place Park, where one high value was detected. Because this might represent an authentic hot spot, ISSI recommends that 30 grab samples be collected at this property, as described above. If the results of the sampling at this and other locations reveal that some schools or parks do have areas of concern, then the need to resample the other sparsely sampled properties should be reassessed.

Conclusions

In essence, ISSI recommends that we envision sampling and analysis at VBI70 locations to be a two-stage process: for residents, we begin with a 3x10 composite approach, and then resample any locations that are in the gray zone or which might have a significant hot spot. This second

tier of residential sampling would be 30 systematic grabs. For property categories where the number of properties is not too large (alleys, schools, parks, commercial, etc), we simply by-pass stage 1 and go straight to Stage 2. This maintains a nice internal consistency in logic and approach, and will generate high quality data at a not-unreasonable cost.

Attachment

Summary of VB-I70 Phase 1 & 2 Data for Parks and Schools

Park Name	Count	Arsenic				Lead			
		Det. Freq	Min	Max	Average	Det. Freq	Min	Max	Average
City of Narobi Park	3	0/3	52	52	52	3/3	38	69	54
Durham Park	12	0/12	44	44	44	6/12	28	420	128
Elyria Park	8	0/8	44	44	44	6/8	28	350	182
Russel Square Park	4	1/4	52	58	54	4/4	72	130	111
Schafer Park	4	0/4	52	52	52	3/4	38	230	112
St. Charles Pl. Park	8	1/8	44	340	82	8/8	170	390	295
Swansea Park	26	1/26	44	57	54	24/26	28	240	96
All Parks	65	3/65	44	340	54	54/65	28	420	137

School Name	Count	Arsenic				Lead			
		Det. Freq	Min	Max	Average	Det. Freq	Min	Max	Average
Cole Middle School	5	1/5	52	67	55	3/5	38	130	60
Harrington School	4	0/4	44	57	51	4/4	150	300	225
Mitchell School	7	0/7	52	52	52	5/7	38	120	70
Swansea School	20	1/20	44	57	47	20/20	45	200	124
All Schools	36	2/36	44	67	49	32/36	38	300	116